HORNET HABITS

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An element of danger always adds zest to the chase, whether it be hunting lions or collecting wasps. There is a lure to that about which lurks a touch of peril, and there is no branch of insect collecting where this is realized to the extent found in the study of wasps. Active, irritable and venomous, they form an item of interest to the investigator who does not prefer to come off unscathed.

My earliest interest in entomological matters was stimulated by a wasp sting. When I was at the age of about three or four years, these insects first forced themselves painfully upon my notice while I was walking close to a stone wall. After the effects had worn away somewhat, I was impelled by a desire to further investigate these "hot-footed" little beasts as well as by a temporary desire to exterminate them. This latter, in the case of several nests, I was able to do with the help of my grandfather and the hired man. These nests I kept as trophies of the chase, stored away in a large pasteboard box, the forerunner of an insect collection.

But despite the inconveniences experienced in their study, wasps and hornets are very interesting and all too little general knowledge is in print concerning them. As a matter of fact, it has been only during the past few years that the differentiation of our commonest forms has been accurately made and even the New York State list fails to record one of our most abundant species.*

Wasps and hornets, in the strictest sense of the term, belong to the Hymenopterous family Vespidæ and generically to *Vespa*, the Latin word for wasp. The term "hornet" was used for

* This species has recently been identified by comparison with specimens in the American Museum of Natural History, determined by Dr. J. Bequaert, as *Vespa vulgaris* L., the common wasp of Europe.

many years to designate one species—*Vespa crabro* Linnaeus, the English or Giant European hornet, as it is called in this country. This true hornet is the largest species of the genus occurring in the United States, and it is not a native species. It is presumed to have been accidentally introduced into the New York region many years ago—even before the advent of the English sparrow into this country—but it has spread very slowly. It now occurs in New Jersey, on Long Island, in the New York City region, up the Hudson nearly to Albany and in southern Connecticut, up the Connecticut River to Hartford. It might be interesting to state that Dr. E. P. Felt sometime ago showed me a sample of a lilac branch from the Chicago region which had been gnawed evidently by this insect, for this wasp or hornet is our only species of *Vespa* which is of economic importance as a destructive agent to vegetation. It has long been branded as a pest, due to its habit in obtaining material for its nest, of chewing around the twigs and branches of various living trees and shrubs, girdling them and thus producing their death. The list of trees thus attacked include lilac, birch, rhododendron, ash and probably others. Around New Haven, it is recorded by Britton[1] as causing damage to dahlias, gnawing the stalks.

Vespa crabro, in this country at least, is fond of the exuding sap of trees and the best way to collect them, aside from finding the nest, is to watch for them late in the summer around such trees as elms, maples or birches, where the bark has been bruised or otherwise injured and from which there is a flow of sap.

The European hornet is also predaceous and an interesting incident is recorded in J. G. Woods' "Insects at Home," of an individual of this species capturing the red atlanta butterfly. The scene is depicted in color in the frontispiece of the book.

In this country, they have been seen to kill and dismember cicadas, and Dr. Britton[2] states that Vanderwerken, a bee expert of Stamford, has reported that they frequently kill honey bees.

From my observations, I would say, however, that *Vespa crabro* is not nearly as active a predator as our own native

[1] Connecticut Agricultural Experiment Station Bulletin 226, p. 214, 1921.

[2] Connecticut Agricultural Experiment Station Bulletin 226, p. 214, 1921.

hornet, the so-called white-faced hornet, *Vespa maculata* L., which I shall discuss in more detail later. Its movements are slower, its sight is even poorer and all in all it is a much less aggressive creature in spite of its greater fame.

History is replete with mention of the hornet. It is referred to in the Bible, but whether or not the reference is actually to *Vespa crabro* is, of course, uncertain.

Nevertheless, it is stated in Deuteronomy, VII, 20 that in delivering the Hittites and Canaanites into the hands of the followers of Moses, "God will send the hornet among them, until they that are left and hide themselves from thee, be destroyed" and that this was actually done was affirmed in Joshua XXIV. 12 when that General in quoting Jehovah's words to the tribes of Israel said, "I sent the hornet before you which drove them out from before you, even the two kings of the Amonites; but not with the sword, nor with thy bow." A case, evidently, of where the sting—if you will pardon the paraphrase—was mightier than the sword!

The name hornet is evidently derived from the vicious buzz of the insect, just as the Latin word *Vespa* was derived from an attempt to simulate the sound.

Vespa crabro generally nests in hollow trees or in unused portions of buildings and makes a very large paper nest, which, however, as a rule is enclosed and not as conspicuous, therefore, as the great gray-white paper nest of our white-faced hornet.

Wasps and hornets furnish an excellent example of Alfred Russell Wallace's principle of warning coloration. These insects with their formidable stings are apt to be let severely alone by vertebrate predators and it is no doubt due to this fact that they owe their dominance in the insect world today. With the exception of butterflies and grasshoppers, bees and wasps are probably our most abundant and conspicuous large diurnal flying insects. They are certainly conspicuous; their contrasting black and white or black and yellow colors fairly cry out their identity. In fact, their coloration is so apparently a protection and warning that it is assumed by many unprotected insects, particularly in the Diptera. All through the Diptera, we find flies aping the color pattern of the outstanding vespids

of their region. In Europe there are at least two asilids—*Asilus crabroniformis* and *Laphria aurea*—patterned after *Vespa crabro,* the latter, by the way, being the more accurate mimic in spite of the name given to the first, while in this country the syrphid *Spilomyia fusca* is a "ringer" for our native white-faced hornet. These instances can be multiplied all over the globe.

Coming to our native white-faced hornet we find an insect which needs no introduction. It has probably introduced itself to many of you in the course of your collecting. Its large paper nest, before mentioned, is familiar to all, the tempting target of boyhood stone-throwing days.

The white-faced hornet, intent on hunting flies around barns, farm houses or other buildings or locations where *Musca domestica* may congregate, is a common sight in the rural districts of the Eastern States. In fact, one cannot help admiring the persistency of this insect in hunting down, in spite of its handicaps, this pest. In spite of repeated failure, the hornet keeps doggedly at it until he gets the fly. The active flies scatter at his or rather her approach and in open flight, the heavy bodied hornet is left far behind. But here is a fly which is lazily contemplating the world in its warm cozy place in the sun, or is sipping some choice viand in the form of some organic refuse clinging to the wood and before it perceives its danger, is pounced upon by the persevering hornet, which was evidently searching for just such a sluggard. Unfortunately, the hornet is further handicapped by poor vision, and it is a common sight to see a hornet butt headlong into a nailhead which it had evidently mistaken for its resting booty. The fact that it is no easy matter for the hornet to secure its prey may influence it to frequent places where flies are in great abundance so that even if several attacks may prove fruitless, there is still plenty of material from which to choose.

As soon as the victim is seized, the hornet follows a regular procedure. It immediately seeks a resting place where it assumes the following grotesque attitude. It suspends itself by one of the posterior legs, head downward and vigorously chews up its prey after clipping off the wings and legs.

The house fly (*Musca domestica*) is probably the most common prey, but the stable fly (*Stomoxys calcitrans*) is also frequently taken.

On August 25, 1916, at Southbridge, Mass., I observed hornets capturing the large carrion fly or "black blow fly" (*Phormia regina*) which swarmed in countless numbers around a small rendering plant.

On August 17, 1917, at Holland, Massachusetts, while walking along a cart road through some brushy woods, I was attracted by a dull, rattling buzz emanating from the dead leaves at my feet. There was a hornet in the act of dismembering a horse fly (*Tabanus orion* O. S.) actually much larger than itself. The fly was still alive and could vibrate its wings, which caused the noise against the dry leaves which first attracted my attention. The hornet lost no time in clipping off the head, wings, legs and abdomen of its prey. After consuming part of the latter, it flew off with the thorax.

On August 25, 1917, at Sturbridge, Mass., I saw a hornet capture a specimen of the gray drone fly (*Eristalis saxorum* Wied.) on a wild carrot blossom.

In August, 1912, I saw one seize a sarcophagid on a pile of lumber at Southbridge, Mass.

The white-faced hornet will kill large asilids, although at least four of our strongest species of the latter have been taken with *Vespa maculata* as prey. They are:

Proctacanthus philadelphicus Macquart
Proctacanthus nigriventris Macquart
Proctacanthus rufus Williston
Mallophora orcina Wiedeman.

In August, 1911, at Southbridge, Mass., I saw a hornet attack a large male *Deromyia umbrina*, while the latter was feeding on another insect. Both dropped to the ground among the grass roots and weed stalks, where in my eagerness to see what was going on, I frightened the hornet away before it had finished the job. The robber fly was still alive, but one wing had been bitten off and the abdomen was nearly severed.

In another case, the asilid was the aggressor. On July 23, 1912, I was watching a hornet at its hunting when a small asilid

(it turned out to be *Asilus erythrocnemius* Hine) flew recklessly at it. The hornet saw it coming and, turning in mid-air, met it with open jaws. It immediately began the chewing up operation, which I terminated in order to get the identification of the asilid.

On August 13, 1922, at Wallingford, Conn., I took a hornet in the net which had just captured the robber fly—*Leptogaster flavipes* Loew.

The encounter between a hornet and a large female *Deromyia umbrina* I have already recounted at a former meeting. In this case, a prolonged struggle ensued, in which the hornet finally freed itself from the grip of the fly and flew away.

So much for robber flies. I took on one occasion a hornet with a tachinid fly, too badly chewed for identification. This specimen was netted with its prey just as it was entering the nest.

Hornets frequently capture the small dragon or damsel flies. Species of the genera *Enallagma* and *Lestes* are often taken. One such instance I have noted as of September 1, 1916, was at the edge of a small pond in Southbridge, Mass., the grassy borders of which with their myriads of *Lestes forcipatus* served as a happy hunting ground for the hornets from a nest in a tree about a hundred yards away. In many cases the *Lestes* in coitu were seized.

On August 27, 1917, at Union, Conn., I saw a hornet carrying a yellow-jacket worker (*Vespa maculifrons*) which it dismembered in the same manner as other prey, except that it seemed to have a more difficult time in so doing.

All the foregoing refer to worker hornets, but I have seen the queens capture prey in the same manner as well. Two such instances are recorded here:

1. Large crane fly—Amherst, Mass., June 10, 1920.
2. Large crane fly—Sunderland, Mass., June 6, 1921.

In neither case was the fly obtained for specific identification, but both were large species of the genus *Tipula,* with the wings marked with black.

Of the smaller hornets, the two common wasps of Europe, *Vespa vulgaris* and *V. gemanica,* do not appear to occur in this country as for a long time recorded. At least the latter does

not. Our most abundant species is probably *Vespa maculifrons* = *V. communis*. This species nests in the ground and is one of the common, so-called "yellow-jackets." It is nearly omnivorous, feeding upon all sorts of organic matter. Honeydew, ripe fruit, cider, blood, garbage, honey, etc., are very attractive to it. They swarm over dead fish or meat. Occasionally they capture other insects. The following I have recorded as captured by worker *V. maculifrons*.

House fly—seen captured—Aug. 12, 1917. Southbridge, Mass. (at rendering plant).

House fly—seen captured—Sept. 28, 1913. On shed, Southbridge, Mass.

Cabbage "worm"—Chadborn, N. C. Sept. 28, 1925.

Cabbage Butterfly—Chadborn, N. C. Sept. 28, 1925.

Stable fly (*Stomoxys calcitrans*) on cow, Chadborn, N. C. Sept. 28, 1925.

In my collection is a specimen taken feeding on a horse fly (*Tabanus lasiopthalmus*) which I saw just after the capture. And I have also taken one with a species of *Lestes*.

The other common yellow-jackets occurring in this region—*i.e., V. vidua, V. diabolica* and *V. pennsylvanica* (?)[3] I have not seen capture insects, although most of them probably do. Mr. Davis[4] records *Vespa vidua* feeding on a damsel fly and *V. carolina* on an asilid fly.

A word in regard to collecting vespids. These wasps should be killed in alcohol (commercial strength) rather than in cyanide bottles. The alcohol fixes the yellow or white colors which very frequently discolor or turn darker where cyanide is used. The specimens may be left in the spirits for a couple of days before being removed and pinned.

In concluding, I again repeat that there is yet a great deal of interest to be learned regarding wasps and hornets if one wishes to brave their stings and study their habits in the field.

Note. This paper was given at the November 18, 1930 meeting of the New York Entomological Society.

[3] *Vespa vulgaris* L.

[4] Bulletin of the Brooklyn Entomological Society, XIV, p. 121, 1919.